

# **ABSTRACT**

## **EPICARDIAL ADIPOSE TISSUE THICKNESS AND ITS ASSOCIATION WITH THE SEVERITY OF CORONARY ARTERY DISEASE**

*Dr. G. Bagiyalakshmi<sup>1</sup>, Dr. P. Saravanan<sup>2</sup>, Dr. M. Rajkumar<sup>3</sup>, Dr. S. Pon Senthil Kumar<sup>4</sup>, Dr. V. Kritthivasan<sup>5</sup>*

*Department Of General Medicine*

### **INTRODUCTION**

Adipose tissue that surrounds the Heart and its vessels functions as a complex organ being composed of adipocytes, stromal cells, macrophages, and a neuronal network, all these being nourished through a rich micro-circulation. Adipose tissue around the heart can further be subdivided into intrapericardial and extra pericardial fat. Their thicknesses and volumes can be quantified by echocardiography as well as computed tomography or magnetic resonance imaging.

Epicardial fat is localised between the myocardium (it's outer wall) and the visceral layer of pericardium. Pericardial fat is anterior to the epicardial fat and therefore located between the visceral and the parietal pericardium.

The epicardial fat is right at the forefront of research and all the attention it gets is due to its anatomical closeness to the myocardium and due to

the fact that these two tissues share the same microcirculation. The epicardial fat layer originates from mesothelial cells and hence obtains its vascular supply from the coronary arteries. It has been shown that epicardial fat is metabolically active and a source of several adipokines and inflammatory cytokines, and there seems to be potential interactions through paracrine or vasocrine mechanisms between epicardial fat and myocardium.

Obesity is considered an important and more so, a modifiable risk factor for atherosclerotic cardiovascular disease (ASCVD). Estimation of visceral adipose tissue is gaining importance and several methods are being evaluated for the same. Correlation of epicardial adipose tissue (EAT) with the amount of visceral adipose tissue through magnetic resonance imaging (MRI) and/or CT (computed tomography) is excellent, the disadvantage being both are either costly and/or cumbersome.

EAT can be quite accurately measured using two-dimensional (2D) echocardiography. EAT being a direct measure of visceral fat rather than anthropometric measurements, carries the advantage of predicting high cardiometabolic risk

## **AIM OF THE STUDY**

To assess the association between epicardial adipose tissue thickness, measured using transthoracic echocardiography (TTE), and the severity of coronary artery disease, measured using coronary angiography.

## **MATERIALS AND METHODS**

### **STUDY POPULATION:**

The study will be conducted on 100 consecutive patients admitted to the Department of Cardiology, Government Rajaji Hospital & Madurai Medical College during the study period who underwent coronary angiography for suspected coronary artery disease.

### **INCLUSION CRITERIA:**

Patients who underwent coronary angiogram for suspected coronary artery disease without meeting the exclusion criteria

### **EXCLUSION CRITERIA:**

- prior history of documented acute coronary syndrome
- Trans Thoracic Echo imaging was inadequate for the measurement of epicardial fat thickness (poor echo window)
- Previously history of coronary artery bypass graft surgery (CABG)

- Previous history of percutaneous coronary intervention (PTCA)
- chronic kidney disease
- chest deformities
- chronic lung disease
- pericardial and/or pleural effusion on transthoracic echocardiography
- forms of CAD other than angina pectoris or acute myocardial infarction (MI), including coronary vasospasm, coronary ectasia, or turbulent or slow flow

#### **ANTICIPATED OUTCOME:**

- Significant correlation between epicardial fat thickness, measured using transthoracic echocardiography (TTE), and the severity of coronary artery stenosis, measured using coronary angiography.

#### **DATA COLLECTION**

Enrolled patients underwent complete evaluation including detailed clinical examination and investigations including ECG, 2D echocardiography and coronary angiogram as a part of their diagnostic procedure to identify the involved coronary artery

The 12-lead ECG was recorded for all patients at a speed of 25 mm/s and voltage of 10 mm/mV

### ***Echocardiography***

All echocardiographic measurements were performed by the same cardiologist, who was blinded to the patients' clinical information

Parasternal and apical views were obtained. The EAT thickness was measured from the standard parasternal long-axis view on the free wall of the right ventricle, perpendicular to the aortic annulus at end-systole as it was compressed during diastole

The EAT was identified as the echo-free space between the outermost border of the myocardium and the visceral layer of the pericardium. The thickest point of the EAT was measured in each of 3 cycles, and the average value was calculated.

### ***Coronary angiography***

With the help of the Judkins' technique, Coronary angiography was performed with either the femoral artery or radial artery approach. The severity of coronary atherosclerotic lesions was evaluated from at least 3 projections and patients were appropriately classified into single, double or triple vessel according to the number of vessels involved. Hemodynamically, significant stenosis was defined as a diameter stenosis of  $\geq 50\%$  in left main coronary artery (LMCA) and  $\geq 70\%$  in vessels other than LMCA.

## **RESULTS**

Out of 100 patients 79 patients were male and 21 patients were female (~1.5:1). It is consistent with previous studies because nature of disease is more common in male as compared to female.

Out of these 100 patients 74 had diabetes, 62 had hypertension, and more than had LDL in the range of and 41 had SVD, 34 had DVD, 25 had TVD.

In these 100 patients EAT correlated very well with the severity of CAD with mean of 6.56 for SVD, 8.42 for DVD and 11.06 for TVD patients

## **CONCLUSION**

Echocardiographic epicardial fat is an inexpensive, reproducible, and direct measure of visceral fat. It may have an important role in predicting and stratifying cardiovascular risk in both clinical care and the research setting.

An increased amount of epicardial fat is associated with both obesity and coronary artery disease

Quantification of EAT thickness by means of echocardiography—a relatively inexpensive, readily available method—might be beneficial in the early identification of patients who have complex or critical CAD.

This knowledge could enable earlier referral of these patients for diagnostic coronary angiography and timely interventions as its assessment is sensitive, easy, non-invasive and cost-effective for prediction and severity of CAD patients

#### **KEYWORDS and ABBREVIATIONS**

*CAD (coronary artery disease), EAT(Epicardial Adipose Tissue), TTE(Trans Thorasic ECHO), CAG(Coronary Angiogram), TVD( Triple Vessel Disease), LDL(Low Density Lipoprotein).*